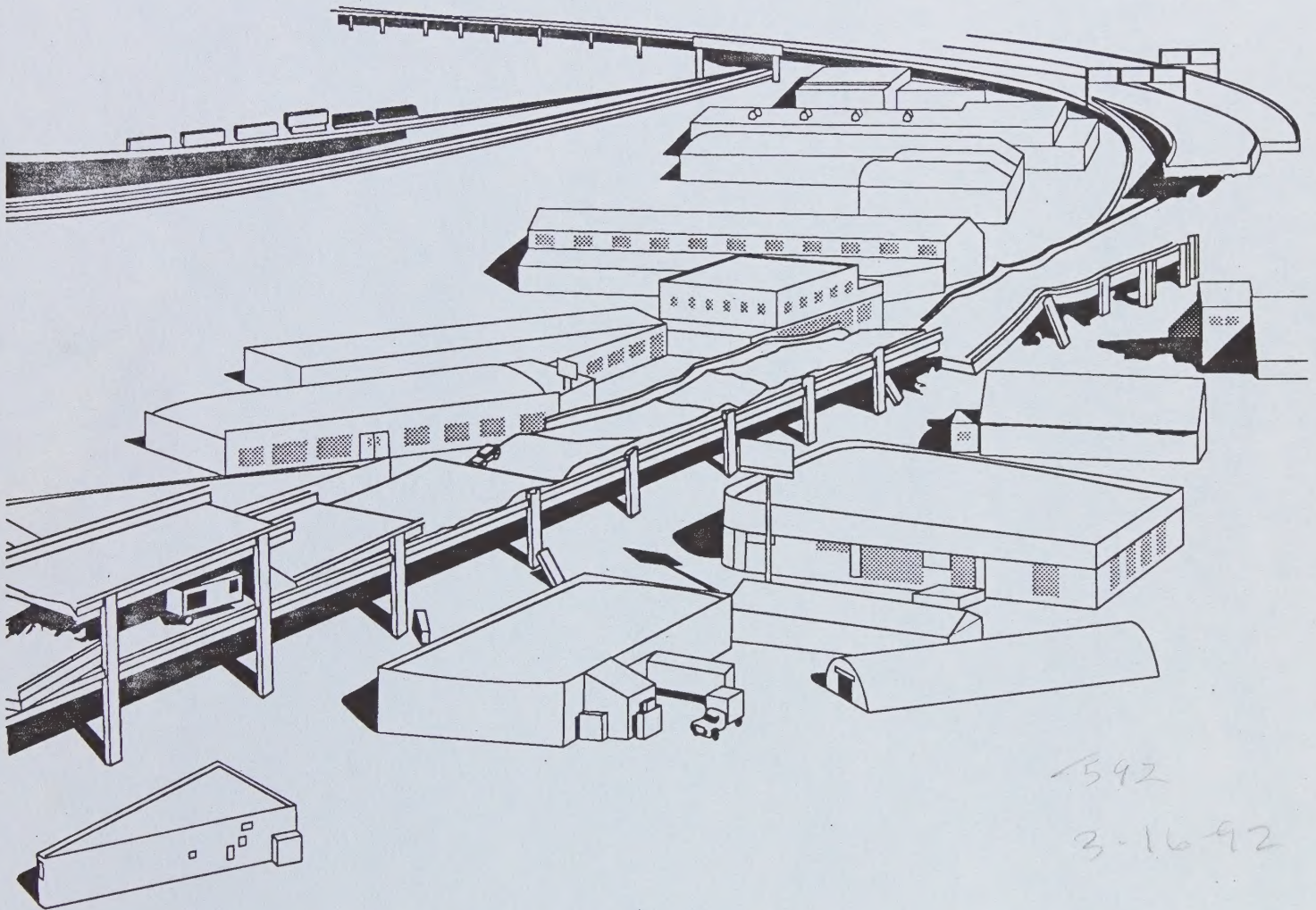


The Missing Transportation Link: Economic Impacts of the Closure of the Cypress Freeway on the San Francisco Bay Area

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Bay Area Economic Forum
Metropolitan Transportation Commission

December 1990



**BAY AREA
ECONOMIC
FORUM**

MTC
METROPOLITAN
TRANSPORTATION
COMMISSION

**The Missing Transportation Link:
Economic Impacts of the
Closure of the Cypress Freeway
on the San Francisco Bay Area**

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of the Cypress Structure



Introduction

The purpose of this document is to provide a comprehensive overview of the project's objectives, scope, and timeline.

This document is organized as follows:

1. Project Overview: A brief summary of the project's goals and objectives.

2. Scope: A detailed description of the project's boundaries and the work to be performed.

3. Timeline: A schedule of the project's key milestones and deliverables.

4. Resources: A list of the personnel, equipment, and materials required for the project.

5. Risks: An assessment of the potential risks to the project and strategies to mitigate them.

6. Conclusion: A summary of the project's importance and the next steps.

7. Appendix: Additional information and documents related to the project.

8. Glossary: A list of key terms and definitions used throughout the document.

9. Index: A list of the document's sections and their corresponding page numbers.

The project is expected to be completed by the end of the year.

The project manager is responsible for ensuring that the project is completed on time and within budget.

The project team is composed of the following members:

Project Manager: [Name]

Team Lead: [Name]

Introduction

It took the 1989 Loma Prieta earthquake just 15 seconds to raze the Interstate 880 Cypress Viaduct in Oakland, killing 42 people, injuring many others and leaving a mile-and-a-quarter-long missing link in the San Francisco Bay Area's transportation network. It will take considerably longer for the surrounding community, and indeed the region, to recover. While the costs in terms of loss of life and human suffering cannot be measured, it is possible to gauge the economic aftershocks from the loss of this vital stretch of roadway.

This report, prepared by the Metropolitan Transportation Commission and the Bay Area Economic Forum at the request of the California Transportation Commission, attempts to assess the economic impact of the closure of the Cypress freeway on the movement of people, goods and services throughout the region. Data were gathered with assistance from Caltrans, local government officials, the Port of Oakland and from interviews with representatives from commercial freight and retail industries. In addition, the Federal Reserve Bank applied a regional economic model to estimate the annual economic costs of the Cypress disruption.

The report is not intended to advance a particular alternative or alignment for a replacement facility. Rather the goal is to provide information on the economic consequences of the closure of the Cypress freeway on the Bay Area.

The following questions are addressed: What does added congestion on an already-crowded transportation network cost the regional economy? What are the possible consequences of continued delay on future economic growth -- both in the city and port of Oakland and in the region?

The findings show that a connector between I-880, I-80 and the Bay Bridge contributes not only to the economic vitality of the East Bay, but to the entire Bay

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Area. Based on Caltrans' forecasts of congested vehicle hours, the Bay Area Economic Forum estimates that some \$22.5 million has been lost to the region to date due to the absence of a replacement facility, and that there will be continuing economic losses pending a resolution to the resulting traffic disruptions.

In the intervening 14 months since the Cypress freeway collapsed, Caltrans has undertaken a thorough review process to hear public comments concerning various replacement alternatives. An Environmental Impact Report has been prepared, and input from local officials has been received. With this important public review phase nearly complete, the time draws near for selection of a replacement for the Cypress freeway.

MTC and the Bay Area Economic Forum support efforts to select a preferred freeway replacement alternative. Once a decision is made, we urge Caltrans to hasten the region's recovery from the 1989 earthquake by moving swiftly to build the preferred replacement.

Regional Economic Impacts

The collapse of the I-880 Cypress freeway dramatically illustrates the interdependency of the region's transportation network. With this important stretch of freeway missing, thousands of motorists are forced onto alternate roads that are not designed to handle the added burden.

The significance of Cypress freeway to the region's mobility is evident when viewed against the backdrop of its location within the regional highway network (see Figure 1), and in the context of its local role in distributing traffic to downtown Oakland, the Port of Oakland and surrounding military bases (see Figure 2).

Pre-Quake Transportation Demand and Congestion

Before the earthquake, traffic flows were congested on all routes along the San Francisco Bay Bridge Corridor. Interstate 80 and I-580 leading into the toll plaza regularly operated at capacity, with eastbound I-80 traffic heavily congested as well. According to Caltrans, traffic delay in both directions on this corridor during peak periods varied from 15 minutes to one hour.

Figure 3 shows the relative traffic volumes prior to the earthquake on the major freeways in the vicinity of the I-880 Cypress structure: I-80, I-580, I-880 and I-980. Pre-earthquake traffic flow along the Cypress Viaduct averaged between 162,000 and 176,000 vehicles daily, including 25,000 trucks.

Figure 1

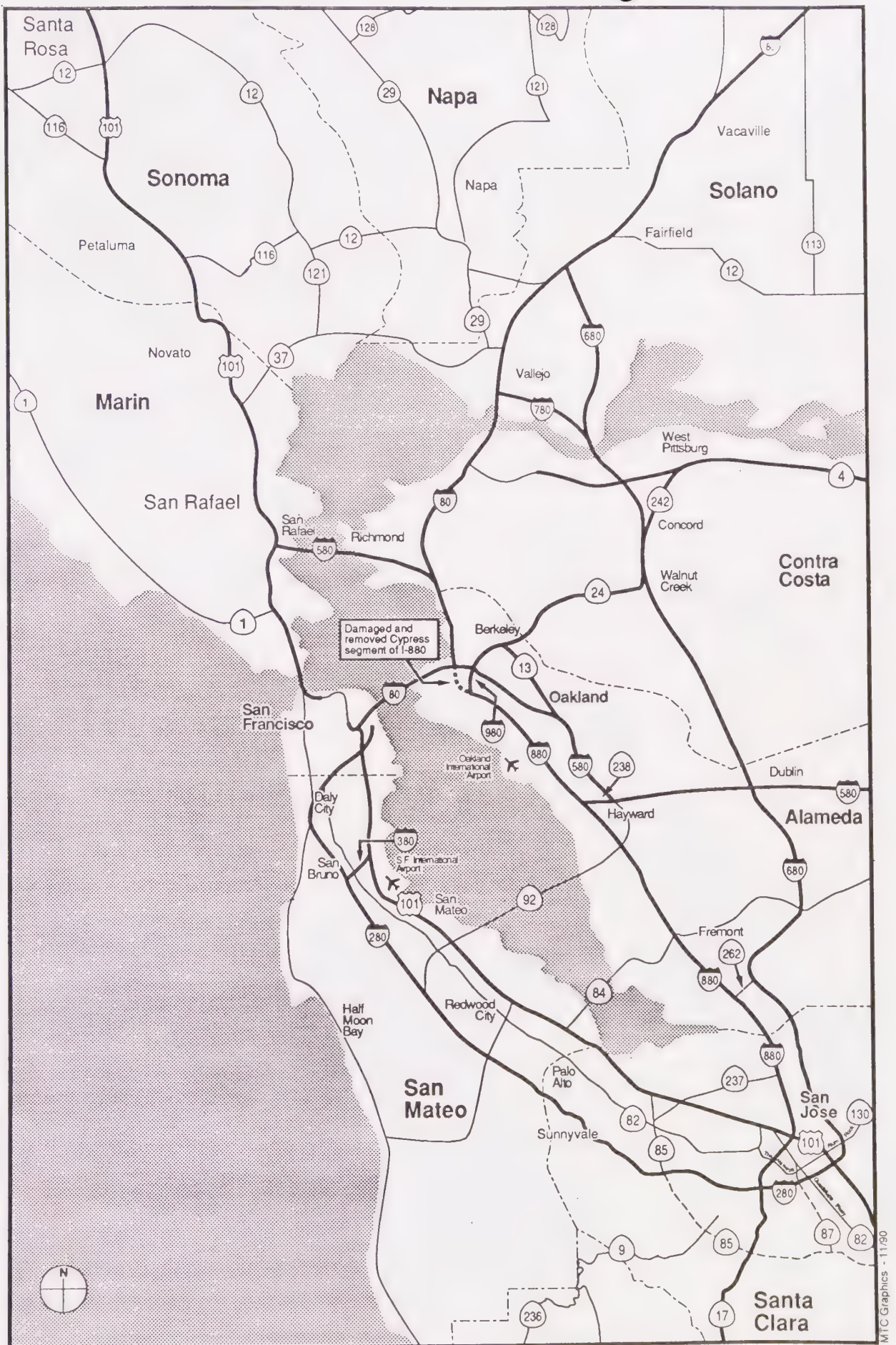
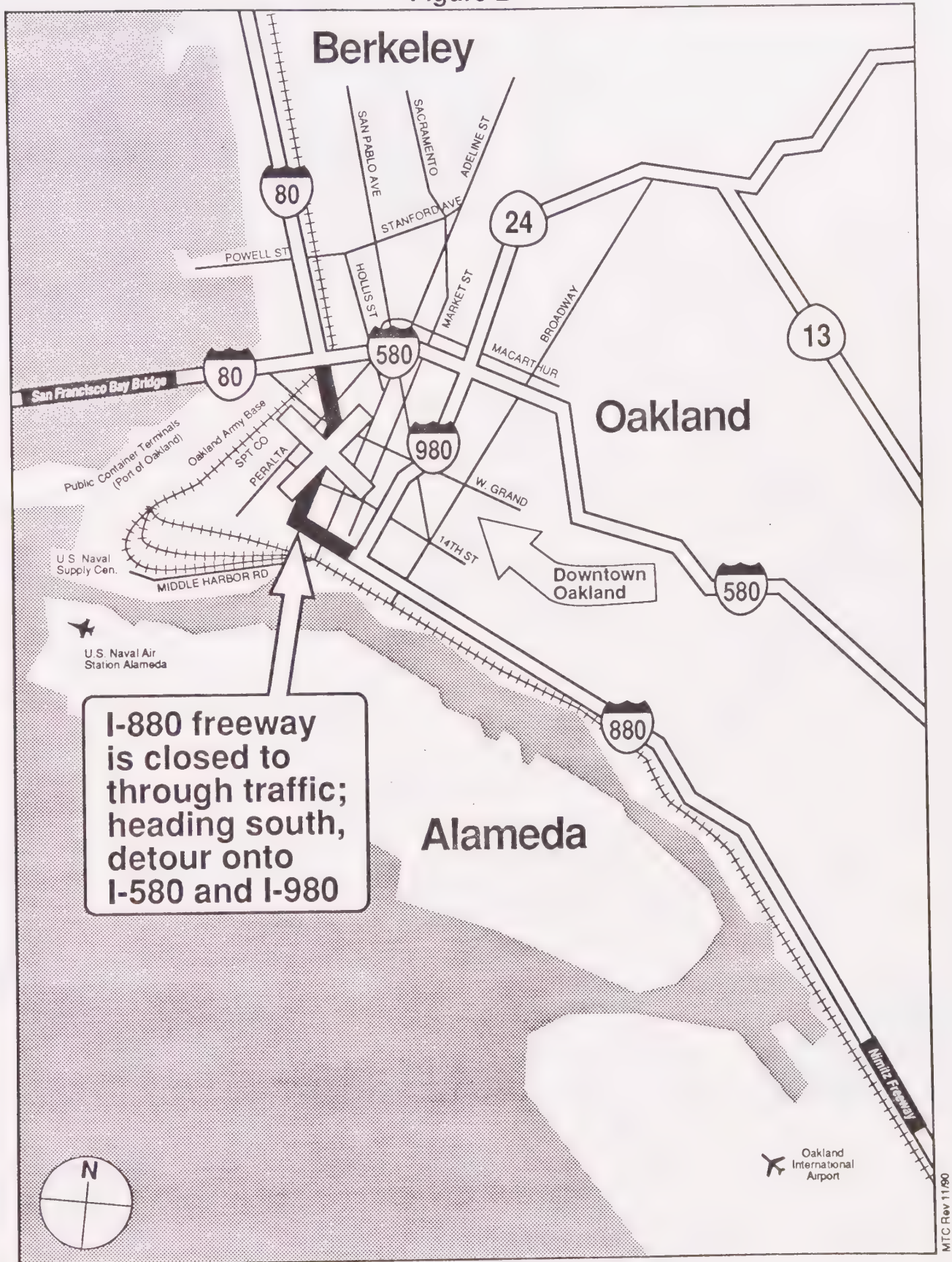
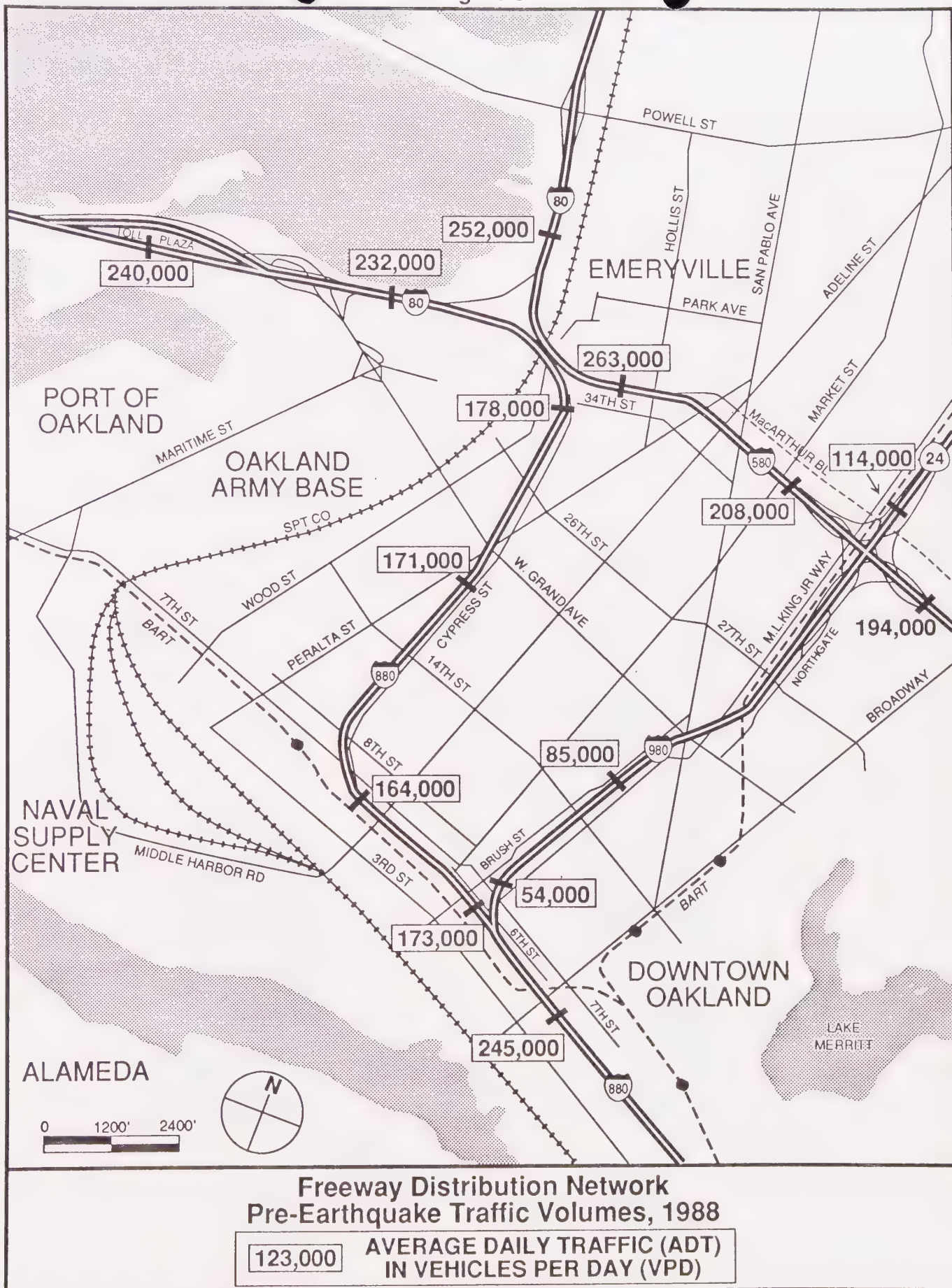


Figure 2



Site of Disruption of Regional Highway System
(Cypress Structure, West Oakland)

Figure 3

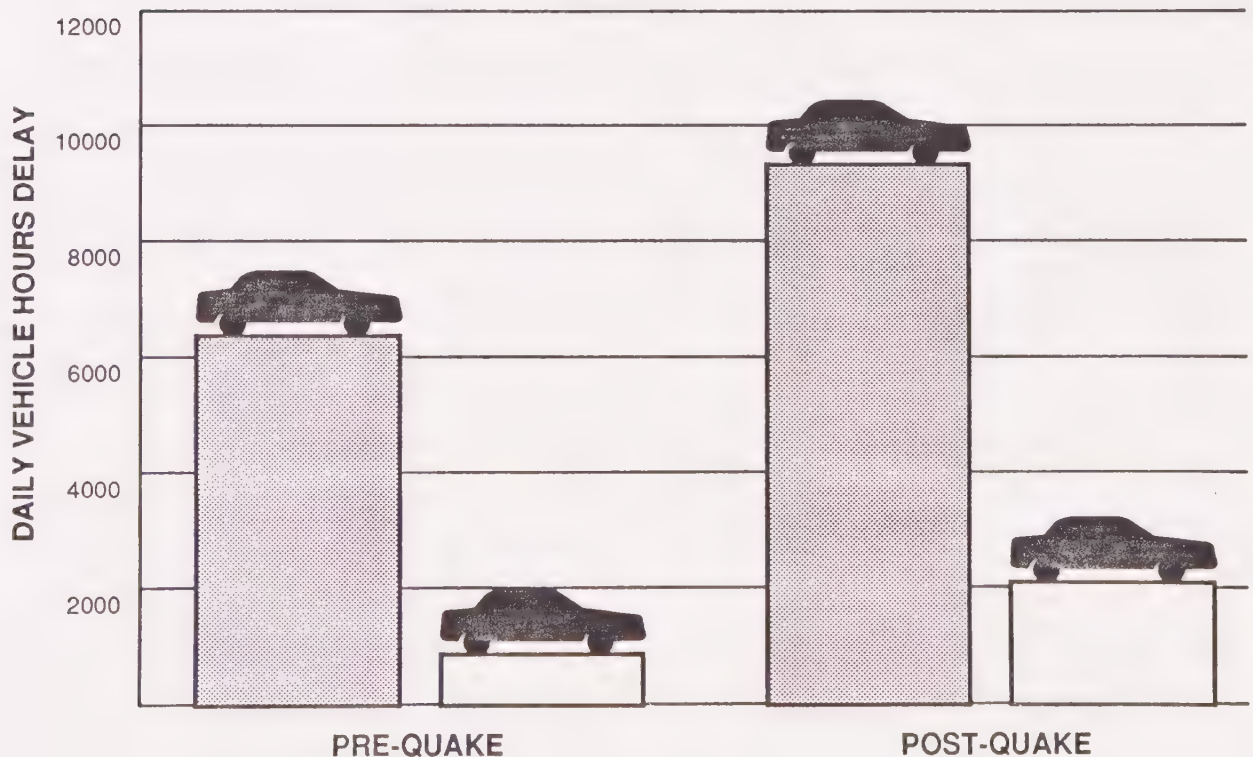


Post-Quake Transportation Demand and Congestion



With the closure of the Cypress freeway, I-880 traffic is redirected onto I-980 and I-580, where congestion is particularly bad during morning and afternoon commute hours. On portions of these freeways, two-lane interchange ramps designed to carry 1,500 to 3,000 vehicles per hour are now carrying up to 4,000 and 5,000 vehicles per hour. In addition, several local streets, including Cypress, Market and Grand, are now carrying traffic of more than twice the pre-earthquake volumes.

According to Caltrans, freeway congestion in the Cypress area has increased by 15 percent, with the vehicle hours of delay on freeways and local streets jumping by 42 percent (see Table 1).

Table 1
Cypress Freeway / Vehicle-Hour Delay Comparison
(I-880, I-980, I-580, I-80 Distribution Network)
(Pre-Quake and Post-Quake)



Source: Caltrans data

KEY	
	FWYS
	STREETS
MTC GRAPHICS 12/90	

The Cost of Congestion

Increasing congestion in the Bay Area translates directly into added costs that multiply over time. Some of the effects of stop-and-go traffic include increased air pollution, lost revenue to retail businesses, higher shipping costs, increased vehicle operating costs and wasted time. For businesses, the net effect is increased overall operating costs. For the general public, more delay means more time wasted in traffic and higher prices for goods and services.

Using Caltrans' projected congestion hours, the Bay Area Economic Forum has attempted measure some of the costs of increased congestion in the Cypress corridor.

Table 2 measures current year costs for passenger car delay and operating costs, as well as the cost of delay on truck inventories and operating costs. Passenger car delays account for over half -- \$13.5 million -- of the total costs to date, which are estimated to be as high as \$22.5 million. If these figures are projected at their present value over 25 years, the figure climbs as high as \$759 million. While it is highly unlikely that these costs will continue for such an extended period, the projection is useful in terms of measuring the benefits of a replacement facility against the costs.

Table 2
The Transportation Costs of I-880 Cypress Disruption

Cost Item	Current Year Costs (\$m)		25-yr Present Value (\$m)	
	High Estimate	Low Estimate	High Estimate	Low Estimate
Passenger Car Delay	\$13.50	\$11.25	\$472.68	\$393.90
Passenger Car Operating Cost	5.63	4.69	196.95	164.13
Truck Operating Cost	3.38	2.81	88.14	73.45
Truck Shipping Inventory Cost	0.06	0.05	1.57	1.30
Total Costs	<u>\$22.57</u>	<u>\$18.80</u>	<u>\$759.34</u>	<u>\$632.78</u>

Source: Bay Area Economic Forum, based on Caltrans' forecasts.

Regional Commuter Movements

There are significant cross-county movements of the Bay Area workforce to industrial and commercial establishments, with the bulk of the regional workforce commuting to work on regional highways. Interstate 880 provides a vital regional transportation link between employment centers, connecting Northern and Southern

portions of the region. The impaired mobility of the region's workforce caused by longer commute times due to Cypress corridor disruptions decreases productivity and makes it harder for employers to retain a quality workforce.

Regional Commercial and Industrial Movements

The strategic importance of I-880 to regional commerce and industry rests partly on the accessibility it provides to the Port of Oakland, a major regional maritime facility, and the concentration of trucking and industrial establishments in its corridor. The Cypress Viaduct directly served the port, the Army Supply Depot, the Naval Supply Center, the U.S. Post Office Distribution Center, and trucking and distribution centers, some of which are involved in intermodal business. The prohibition of truck traffic on Interstate-580 east of Grand Avenue also contributed to the heavy truck usage on I-880, as was reflected in the high percentage of pre-earthquake truck traffic on the Cypress Viaduct, an estimated 15 percent of daily traffic in the corridor.

Interviews with a broad cross-section of persons including public officials, distribution company managers and owners and managers of trucking companies, confirm that the closure of the Cypress Viaduct has adversely affected business. The consensus is that traffic congestion on alternate routes such as I-980/I-580 and on local streets has disrupted neighborhoods and delivery schedules as well as adding to the costs of doing business.

The Regional Trucking Industry

Truck traffic on I-880 is important to intermodal trade from the Port of Oakland, and to some degree, commercial traffic to Oakland International Airport.

According to reports from several trucking companies, the closure of the Cypress Viaduct has resulted in increased travel time of between 20 and 30 minutes per trip. This has raised labor, fuel, maintenance and inventory costs, which are ultimately borne by consumers in the form of higher prices.

Representatives of the regional trucking industry were asked for examples of how the closure of the Cypress Freeway adversely impacts their businesses. One company, Bob Rich-Schroeder Trucking, Inc. of Hayward, used the Cypress Viaduct to ship goods from the Port of Oakland to San Francisco, Richmond and neighboring cities. A company representative indicated that over half their 25 trucks used the Cypress Viaduct two to three times daily. Since the earthquake, an extra 20 minutes is needed, on average, to make the same trip on alternate routes.¹

Another trucking industry representative confirmed the adverse impact.² Cal Cargo, a trucking, container freight and warehouse business located on Coliseum Way in Oakland moves between 80 to 100 containers per week, and averages 40 trips per day. The additional time required to meet business commitments is estimated at 8 to 10 hours per week. As a result of the disruption in this corridor, the company was forced at great expense to open a new warehouse in West Oakland to accommodate new delivery schedules.

Evidence of the impact on regional commerce and industry can be found in other sectors, including the retail grocery trade. Horizon Beverages is a 25-truck warehouse beverage distribution operation located in Oakland on 20th Street, close to the Cypress alignment. The closure of this freeway has directly impacted the company's activity by forcing them to use alternative routes that require, on average,

¹Charles Ramorino, Bob Rich-Schroeder Trucking Inc., Hayward, also Chairman of The Bay Area Off-Peak Delivery Program (organized by The California Trucking Association)

²Joe Muzzin, Cal Cargo

an extra 30 minutes in travel time in each direction. This additional travel time is translated into one-hour overtime compensation per trip.

Increased travel time is also a problem for Oakland-based Safeway Stores, one of the largest retail grocery chains in the Bay Area, with some 40 percent of the regional grocery trade. Interstate 880 provides a major link between its distribution centers in Richmond and Sacramento and its markets in the South Bay. A representative³ indicated that the company's operations have been heavily impacted by the Cypress freeway closure, since an average of more than 200 truck deliveries per day are made via the I-880 corridor to Safeway's 101 Bay Area stores. The effect of the closure has been to add one hour of travel time per trip.

The Port of Oakland

Another example of the regional strategic importance of I-880 is its role in providing highway access to the Port of Oakland, which accounts for 90 percent of the container cargo trade in the Bay Area.

The closure of the Cypress and the resulting congestion near the Port of Oakland is especially significant, given that other regional ports either cannot accommodate container freight or lack sufficient dock and land space to handle the high volumes of container cargo coming into the region.

Port of Oakland officials indicate that if gridlock develops over the next few years, further growth in maritime activity could be restricted. This would result in a major loss to the region, given current efforts to expand the port's share of burgeoning Pacific Rim trade, and its status as a major trading center.

³Louie Gonzalez, Safeway Stores, Inc.

Port of Oakland revenues have increased by more than 30.6 percent over the last three years, from \$67.7 million in 1987 to \$88.5 million in 1990. The port expects to double its activity over the next 10 years based on expected growth in regional sea cargo transportation. A number of improvement projects are being planned to support this expected growth. However, these improvements hinge upon a fully integrated system of sea, rail and roadway connections. Thus, improved highway access is of extreme importance to the continued economic benefits derived from the port.⁴

As a major local employer, the Port of Oakland also occupies a central place in the economic well-being of the city of Oakland. As of December 1988, the port's activities directly supported some 4,300 jobs. Employment is expected to reach 8,600 over the next 10 years.

Industry sales based on maritime operations amounted to \$900 million and generated \$2 million in tax revenues to the city of Oakland. Given its strategic role, any adverse impact on the port's activities due to highway congestion affects local economic vitality.

Economic Impacts on the City of Oakland

Investment in transportation infrastructure can provide a powerful stimulus to local economic growth by reducing the costs of transporting goods and labor, thereby enhancing the economic competitiveness of a region. The absence of a

⁴Senate Concurrent Resolution No. 96, and Improving Access to California's Ports, California Transportation Commission, February 1990

replacement for the collapsed Cypress Viaduct has severely impacted mobility within the city of Oakland.

Due to Cypress corridor disruptions, Interstate 980, which was built primarily to serve the needs of downtown Oakland retail activity, now also supports commercial freight traffic. Increased traffic congestion on I-980 and local streets resulting from the Cypress Viaduct closure is a serious impediment to local traffic circulation. This could curtail local economic development in coming years.

The planned development of the Oakland-East Bay Galleria, a major commercial venture for the city of Oakland, was based on the assumption of an adequate highway and road network to support the circulation of traffic to the Oakland downtown area. The current heavy traffic volumes on the I-980 freeway undermines its strategic value to future local economic and business development.

Table 3 shows pre- and post-earthquake traffic on affected local streets. The average increase in traffic on these streets is 50.65 percent. The most dramatic increase is on Cypress Street, where daily traffic has surged by 126 percent.

Table 3

Comparison of Pre- and Post-Earthquake Traffic
(vehicles per day)

	Pre-quake	Post-quake	%Increase/ Decrease
Facility	January 1989	September 1990	
Maritime Street	16,000	26,500	66.63%
7th Street	16,000	17,100	6.88%
Grand Avenue	13,500	21,900	62.20%
Market Street	9,000	15,600	73.33%
Cypress Street	7,500	16,950	126.00%
Adeline Street	6,000	5,411	-9.82%
Peralta Street	3,000	3,500	16.65%
All Streets	<u>71,000</u>	<u>106,961</u>	<u>50.65%</u>

Source: Draft Environmental Impact Report/Statement,
I-880 Cypress Replacement Project, Caltrans, Table 5-4, p. V-15.

Conclusion

The transportation and economic aftershocks of the collapse of the Cypress freeway are still being felt. The absence of a replacement facility impacts economic development on a local and regional scale.

To date, closure of this key transportation link has cost the region an estimated \$22.5 million in longer travel times, higher vehicle operating costs, and increased truck inventory costs.

Particularly impacted is the Port of Oakland, where future economic development is planned assuming adequate highway access to its facilities.

The absence of a replacement facility is also taking its toll on the city of Oakland, where added congestion and traffic spill-over is disrupting alternate freeways and local streets, and adding to local business costs.

Once a political and community consensus is reached, Caltrans should move expeditiously to build the preferred replacement structure. This reconstruction should be a high priority in any strategy to sustain the economic vitality of the region.

Addendum

Methodology for Evaluating The Impact of the Loss of the Cypress Structure

The Bay Area Economic Forum, a regional consortium of business, government, and university leaders, assisted in the preparation of the economic impact assessment. They provided the services of Dr. Randall Pozdena, vice president of the Federal Reserve Bank of San Francisco. Mr. Pozdena is a former economics professor and consultant, and coauthor of a handbook on economic evaluation of highway projects published by the American Association of State Highway Officials.

Impact assessment

The impact assessment incorporates the effects of lost time and increased operating costs that resulted from the loss of the Cypress structure. The interest cost of goods delayed in transit also was estimated. It is likely that increased noise and air pollution also have resulted from the damage to Interstate 880, because of the increased incidence of interrupted vehicle flows and the diversion of traffic to local streets. The Forum staff did not have the necessary data to include these effects in the assessment.

Time Losses

Time Losses due to lengthened travel times are the main impact of the I-880 damage. Using estimates of added daily vehicle hours of delay, the Forum and MTC staff calculated the average annual cost of this delay. This calculation assumed that the value of time per hour of those impacted equals the median wage of the region. Although commuting is non-working time, behavioral studies have confirmed that commuters value such time at roughly the level of their wage. In the case of truck traffic, the value of time used was the estimated wage of truck drivers.

Operating Costs

The added travel times also generate increased operating expenses. Lacking specific data, the conservative assumption was made that fuel and wear-and-tear expenses associated with these longer trip times was the typical average hourly operating cost under normal conditions. In fact, idling vehicles and vehicles travelling in interrupted flow use more fuel, and suffered greater wear and tear than vehicles traveling smoothly at 40 miles per hour. Hence, the estimate provided by the Forum likely is a low estimate of the operating cost impacts.

Truck Inventory Costs

When goods in transit are delayed, the owner of those goods must carry financing for a longer period between shipment and sale. Thus, inventory costs rise by an amount equal to the delay times the rate of interest times the value of the shipment. In the calculations, an annual interest rate of 12 percent and an average shipment value of \$35,000 was assumed. Both are conservative assumptions.

High and Low Estimates

Because of the scale of delays involved, some traffic has chosen not to travel at all. For these travelers, less costly alternatives apparently existed. Hence, the impact on them is

smaller than the impact on those that continue to travel. As a means of recognizing this possible source of bias, the Forum provided high and low estimates of the impacts. The high estimates assume that the average impact affected the full volume of pre-quake traffic; the low estimates assume that those who chose not to continue traversing the damaged portion of the network suffered no impact whatsoever. The actual impact lies somewhere between these two numbers.

25-year Present Value

The forum also provided an estimate of the impact aggregated 25 years into the future. This calculation assumes that the delays experienced today will grow at the rate forecast by Caltrans. The value today of that stream of future delays is then calculated using a standard present value calculation. (A technical note: no inflation in time values or operating costs is assumed over the 25-year period; hence, for consistency, a real interest rate is used rather than a nominal rate in the present value calculation.)

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